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ABSTRACTS

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THE PROBLEMS OF RE-CULTIVATION OF THE EX-MILITARY BASE IN ZYBROVKA SETTLEMENT (THE GOMEL REGION)

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In the result of the USSR disintegration and the withdrawal a range of military services there remained a range of military bases on the territory of Belarus. The above-mentioned bases are not used at present; their ecological fate is not examined. The peculiarities of the military base in Zybrovka is its location in the densely populated region in immediate proximity to Gomel.

There are several inhabited areas which use mine shafts and individual water intakes for their economic needs and sinking water supply; and the ground water in take station Korenevsky" providing Gomel central - water supply is located in the distance of 5-6 km North-West of the base.

The ex-military base Zybrovka is a complex of buildings and constructions, which supplied a distant air regiment of the USSR Air Forces. The most dangerous objects from the point of view of environmental pollution are the lubricant and fuel material deposits, steering zone and take-off and landing strip.

The results of the research showed that soils of the base are polluted with oil products (up to 10.6 g/km of the ground) and heavy metals (lead, zinc, cadmium—exceed the Permissible Concentration Limit). Surface water on the lubricant and fuel material deposits and in the UT river are polluted exceeding the Permissible Concentration Limit by oil products and heavy metals (lead, zinc, chromium, cadmium). The oil products concentration in the Dnieper water bearing complex of low intensity which is deposited first from the base surface has the capacity of 10-16 m magnitude reaching 630 g/l.

In the result of the research some technical measures of draining aside the surface (storm) and ground water, its disposal as well as of biotechnological soil recultivation from pollution with oil products. The basic constructive solutions of the General Plan, industrial buildings and engineering constructions were prepared. The techno-economical indicators of the base re-cultivation were defined.

RESEARCH OF ROLE OF THE NONPOINT SOURCES OF POLLUTION IN THE CHANGE OF THE GROUNDWATER QUALITY

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Precipitation, fertilizers, motor transport, technical accumulations and other are one of the importance factors, which effect on the groundwater (GW) quality. Those sources carry in environment a number of pollutants with different classes of danger: the ions of strong acids, the heavy metals, biogensis and others. In terms of permanent anthropogenic load on environment the accumulation of pollutants happens everywhere: in soils, plants, atmosphere, in GW. The GW is the source of pollution for surface water bodies. The watershed of Ivanovo reservoir has been the item of our researchs for 25 years.

The pollution of environment of the region happens in result of gaseous discharges of enterprises, the surface flow from territories of populated areas and factories, emissions of cars, of the mineral and organic fertiliser application and the chemical-weed.

The watershed basin of reservoir is 42000 sq. km. It occupies the areas of Tverskoy region mainly, Moscow, Smolenski and Novgorodski regions - partly. 65% of population live in towns and settlements, 30 towns, settlements, and approximately 12 thousands of villages are numbered here. Over 300 industrial enterprises are here. Towns Tver (460000 population), Dubna (490000 population) and Konakovo (46000 population) are disposed on shores of reservoir directly. Their technogenic impact is the most significant on the environment. The pollution of environment of the region happens in result of gaseous discharges of enterprises, the surface flow from territories of populated areas and factories, emissions of cars, of the mineral and organic fertiliser application and the chemical-weed.

Summary quantity of emissions in atmosphere from thermal-power plants (dioxide nitrogen, sulphurous anhydride, hard substances, oxide carbon) is 13517,2 tons in 1995 in Tver region. Arable lands occupy near 30% of watersheds.

In order to assess the role of nonpoint sources in pollution of GW, in particular, flue emissions enterprises and influence of cars were sampled approximately 100 wells and bores. The distribution maps of the sulphate-ion in GW were drawn for the water protection zone (WPZ) for the end of the 70's and for the end of the 90's. It is revealed, that during last 19 years considerable pollution of GW by sulphates took place. Concentrations of sulphates did not exceed 50 mg/l mainly in the end of the 70's. At present concentrations of sulphates 100-300 mg/l are fixed on greatest part of the WPZ. Increase of concentrations of sulphates in GW of the WPZ links with the growth of the sulphate content in precipitation here, and with increase of motor amount.

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Table 1 presents data concerning hydrochemical composition of snow and rainwater. Mean annual rainfall is 500-600 mm on the watershed. Precipitation dissolves the sulphuric and nitrogen compounds, chloride, oxide of carbon, containing in air. So the sulphur, nitric and carbonic acids are farming, and pH of precipitation are reducing up to 4.5-5.0, especially in the first portions of precipitation. Acid rains, leaching in soils and rocks of the aeration zone, washout heavy metals, organic matter, change pH and Eh of the soil solutions. The content of hydrocarbates, calcium, magnesium and other ions in GW are decreasing due to enrichment of precipitation by sulphates.

Most considerable changes of type and composition of GW are observed in the area of support [1].

Table 1. Selective hydrochemical composition of precipitation.

<table>
<thead>
<tr>
<th>Date</th>
<th>Village</th>
<th>Type</th>
<th>pH</th>
<th>NO\textsubscript{3}</th>
<th>NH\textsubscript{4}</th>
<th>SO\textsubscript{4}</th>
<th>Cl</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1999</td>
<td>Ploski</td>
<td>snow</td>
<td>6.18</td>
<td>10.2</td>
<td>1.4</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>July 1999</td>
<td>Ploski</td>
<td>rain</td>
<td>6.5</td>
<td>1.7</td>
<td>0.4</td>
<td>15.0</td>
<td>1.1</td>
</tr>
<tr>
<td>July 1994</td>
<td>Ploski</td>
<td>rain</td>
<td>6.6</td>
<td>0.7</td>
<td>1.8</td>
<td>16.0</td>
<td>3.2</td>
</tr>
<tr>
<td>April 1995</td>
<td>Ploski</td>
<td>rain</td>
<td>5.3</td>
<td>1.9</td>
<td>1.9</td>
<td>31.0</td>
<td></td>
</tr>
<tr>
<td>June 1995</td>
<td>Ploski</td>
<td>rain</td>
<td>5.75</td>
<td>1.1</td>
<td>1.1</td>
<td>21.2</td>
<td>5.4</td>
</tr>
<tr>
<td>March 1996</td>
<td>Vahrameev</td>
<td>snow</td>
<td>4.7</td>
<td>2.0</td>
<td>1.9</td>
<td>21.2</td>
<td></td>
</tr>
<tr>
<td>August 1999</td>
<td>Konakovo</td>
<td>rain</td>
<td>5.3</td>
<td>2.0</td>
<td>1.9</td>
<td>21.2</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 presents some results of researches of GW along motorways. Concentrations of sulphates in domestic wells, disposing along motorways and local roads (in zone to 30 m), exceed by 5-6 times the sulphate concentrations in wells, locating far from motorways or locating at a distance of more than 150-200 m.

Table 2. Content pollutants in GW into zone of affect of motorways (1) and out of (2).

<table>
<thead>
<tr>
<th>Village</th>
<th>NO\textsubscript{3} (mg/l)</th>
<th>NH\textsubscript{4} (mg/l)</th>
<th>SO\textsubscript{4} (mg/l)</th>
<th>Cl (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vahonino</td>
<td>24.3</td>
<td>0.33</td>
<td>72.0</td>
<td>18.4</td>
</tr>
<tr>
<td>2. Rjabinski</td>
<td>0.1</td>
<td>0.46</td>
<td>14.0</td>
<td>8.0</td>
</tr>
<tr>
<td>1. Vahrameev</td>
<td>63.8</td>
<td>0.5</td>
<td>60.0</td>
<td>319.0</td>
</tr>
<tr>
<td>2. Vahrameev</td>
<td>19.7</td>
<td>0.7</td>
<td>35.0</td>
<td>99.0</td>
</tr>
<tr>
<td>1. Roshdestevno</td>
<td>29.9</td>
<td>0.56</td>
<td>455.0</td>
<td>10.4</td>
</tr>
<tr>
<td>2. Okulovo</td>
<td>3.35</td>
<td>0.54</td>
<td>50.0</td>
<td>4.2</td>
</tr>
</tbody>
</table>

The multi-annual monitoring of the GW quality on a watershed of Ivanovo reservoir showed that the nonpoint pollution sources have a considerable importance in change of the reservoir water quality.

At present the stable tendency is observed to the increase of the sulphate concentration in GW and precipitation. It testifies, what the acidification of natural water occurs, and GW too.

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Reference

HYDROGEOCHEMICAL ESTIMATION OF WATER QUALITY CONDITION OF THE TERSK-KUMSK ARTESIAN BASIN

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Since 1994 the river Terek has become the most negatively affected and polluted one in Russia. The latest political situation in Chechen Republic has stood on the way of planning the protection against water pollution and safeguarding its water resources.

During the Chechen war (in 1994-1996, 1999) the lower reaches of the river Terek have become seriously poisoned